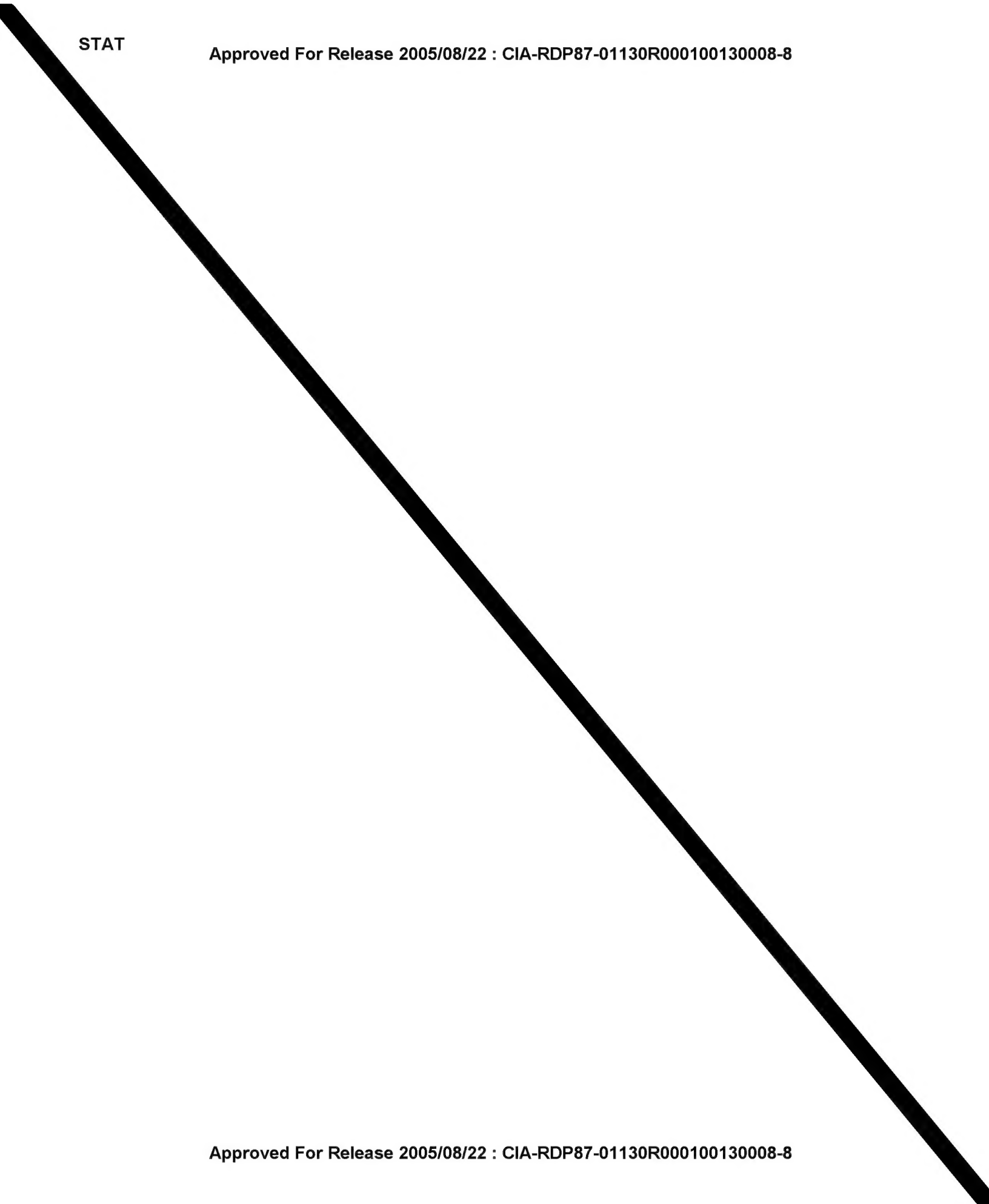

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National Gallery of Art

Washington, D.C. 20565
Telephone: (202) 737-4215
Cable Address: NATGAL

April 15, 1981

STAT [redacted]

Logistics Services
Room 3E 14
C.I.A.
Washington, D. C. 20505

STAT [redacted]

Enclosed please find the article I mentioned to you on the whitening of zinc white. Unfortunately, this will not solve the problem on your portraits. However, I hope you have a chance to show it to the artist. It may eliminate future trouble.

I hope you will be able to reach a satisfactory solution. I would be happy to assist you further if I can.

I am unable to find my literature on the ultraviolet absorbing covers for fluorescent tubes about which we spoke. However, if I recall, 3-M was one of the companies manufacturing them and you could write to the address to which I referred you earlier.

I hope this is useful to you. I apologise for taking so long in writing.

Sincerely,

Ann Hoenigswald

Ann Hoenigswald
Conservator of Paintings.

Enclosure.

From Ann Hoenigswald
National Gallery of Art.

MEMORANDUM

To: Parties Concerned Date: December 10, 1964

From: Dr. Robert L. Feller

Subject: Whitening of Retouches: Observations on the Tests in the NGA Attic

Research Memorandum No. 33

The Tests: In the press of many other activities, we have not had time to write up the results of the inspections of the test panels prepared by Mr. Modestini, Mr. Rigosi, and Mr. Hecht to test the effect of various retouching methods. A description of these experiments, carried out in the attic of the National Gallery of Art, is recorded in Research Memorandum No. 30, dated January 5, 1961. The notes of many inspection trips were included in a special notebook in Pittsburgh having the title "Observations at NGA, Notes of Field Trips and Inspections". We would like to get this information into a formal record at this time, however.

The test panels in this series were installed in the attic on 4/28/60. The last detailed notes were taken on 8/30/62. The panels are still in the attic and have been kept on exposure and in order.

Results: The first thing that was noticed about the results of these tests was that the deterioration of the films, causing them to turn white, was caused by the light. The areas protected by strips of aluminum w subjected to the same changes in temperature and humidity as the rest of the panel, but, even after four years, there was no whitening observed in the protected regions. The second point that was clearly noticed is that the ultraviolet filter offered considerable protection, slowing down the

deterioration. This is about as expected from our experience with the oxidation of dammar varnish, as noted in the Bulletin of the American Group-II and in the recent review published in Museum News.

Dammar: The series of retouches done in dammar, with French varnish isolation in various stages, showed the worst deterioration of all. Of these, the dammar and zinc white was the worst, followed by the dammar mixed with titanium white. It is known that both these pigments can, at times, increase the photochemical deterioration of paints. The extent of whitening increased as the percentage of white in the retouches increased. It was found that paint strips Nos. 6 and 7 were the whitest; these were retouches done without French varnish isolation. This result suggests that the French varnish might have kept the retouch flexible, perhaps owing to the fact that it could have attacked the retouch and partially combined with the dammar, therefore making it slightly more flexible than when no isolation at all occurred.

Egg Tempera and Dammar: The next worst degree of whitening developed in those combinations in which both egg tempera and dammar were used in a combination of techniques. Of these, again the series made with zinc oxide showed the worst whitening. In this series, particularly EDI, paint strips Nos. 5 and 6 were the whitest. These were cases in which no French varnish had been used to isolate the retouch. It is interesting to note that these two strips were whiter than strip No. 7, which had no dammar isolation between the egg and the dammar retouch. This strongly suggests that it is the optical scattering of the light owing to the breaking up of the dammar retouch and separation from its upper and lower layers that

causes the whitening. In the case of strip No. 7, there was no clear coating of dammar between the egg tempera and the dammar retouch; in strips 5 and 6, where there was a dammar isolating layer between these two, the whitening was more apparent.

A note made at the time says that the whitening increased with the lack of French varnish isolating coats. A note on 11/28/61 also says that there was not much whitening where there were many layers (such as in paint strips 1, 2, 3, and 4) and that the upper layer of varnish popped off the surface when pressed with a needle, very much like the traditional behavior of the Pichetto-type whitening. This last clearly suggests that it is the dammar layer that is giving rise to most of the whitish appearance.

In the series EDI made with titanium white, the whitening increased as the concentration of white pigment increased; yet the worst degree of whitening in this test series was no more than equal to the least degree of whitening in the panel prepared with zinc (note written during the inspection trip of 11/28/61). During the inspection trip of 8/7/61, it was noted that no whitening had occurred in panels EDII where white lead had been used.

Egg Tempera Alone: In series E, retouches made with egg tempera, no whitening was reported during the inspection of 11/28/61, clearly indicating by contrast with the series above, that it is the retouches made with dammar that are the ones that discolor, owing to the deterioration of the dammar medium.

Polyvinylacetate: The most resistant materials seem to be the series made with polyvinylacetate, series A. A note made during the

inspection trip of 8/7/61 noted that there was some whitening in the series AIII made with zinc white. There also seemed to be a marked benefit in protecting the retouches with an ultraviolet filter. Of this series, strip No. 6 had turned whiter than all the others. Again, this was a strip without isolation, simply being Rembrandt varnish, the polyvinylacetate retouch, and a coat of Rembrandt varnish over top. It is very possible that the light attacked the Rembrandt varnish in this test strip, since it had no protection by isolation.

Conclusion: The results clearly show that light, particularly the ultraviolet light that is able to pass through the glass of the skylights, causes the greatest amount of whitening of certain types of retouches. In all cases, the retouches that discolored were those prepared with dammar, for little or no deterioration was observable in retouches prepared with polyvinylacetate or with egg tempera. The greatest deterioration was observed in the retouches that contained zinc white, although a similar form of deterioration was noticed to a lesser degree in retouches prepared with titanium white. The least amount of deterioration occurred when white lead was used. The extent of whitening appeared to increase as the percentage of white pigment in the retouch was increased. The extent of whitening also was diminished when a tough material was used to isolate the various layers, such as polyvinylacetate or French varnish.

To say what causes the whitening of retouches is a complex question and involves a complex answer. First of all, the whitening appears to arise because of the scattering of the light caused by the deterioration of either the retouch vehicle or the area of contact between this vehicle and the

isolating coat. There should be a number of types of retouch systems that can decompose in this manner. Especially prone to do so, however, seem to be mixtures of dammar and zinc white used with little or no isolation before the application of the final varnish. Apparently, to a lesser extent, titanium white can also cause such deterioration, undoubtedly influenced by the degree of photochemical activity of the titanium white. We would espect this activity to be negligible, or at least at a minimum, if the special non-chalking titanium whites were used, such as we sent to Mr. Modestini, Mr. Kiehart, and Mr. Sullivan several years ago and which we called attention to in the Bulletin of the American Group-IIC, 1, No. 1 (1960), p. 9.

We have been concerned with two possible explanations for the particularly great activity of zinc white. ① One is the photochemical activity of zinc white, which might speed up the oxidation of the dammar. ② The other is the chemical activity of the zinc white which may cause it to react with the acids in the dammar forming a coating which may be a special gel and may not be as stable under photochemical deterioration. The present results strongly suggest that it is the photochemical activity of the zinc white that is responsible for the deterioration, for the deterioration also occurred in the presence of titanium white; both pigments are known, of course, to be photochemically active. White lead is not photochemically active, and its presence in the retouches did not give rise to excessive deterioration. This fact also tends to discount the idea that it is the activity of zinc white in forming zinc salts with the acids in the dammar that causes the deterioration, because the white

lead should also form zinc salts (it does so in linseed oil). Since the lead had little effect in the present investigation, the implication is that the formation of salts plays no significant role in the deterioration observed.

The excellent job that Mr. Modestini and his associates did in preparing these elaborate series of test panels is most appreciated. Such elaborate tests are necessary to check each step in the conservation process. There are few laboratories anywhere in the world planning long-term and systematic tests of this type. We hope that there will be opportunities in the future to carry out similar tests.

R. L. Feller

SENIOR FELLOW

R. L. Feller:nm

cc: E. R. Feidler
J. Walker
F. Sullivan
M. Modestini
H. Hecht
P. Kiehart
C. Rigosi

PAINTINGS LOANED TO CIA FROM THE VINCENT MELZAC COLLECTION

	Artist's Name	VM No.	Title, Date & Size	Value
(1)	Bluhm, Norman	VM462	Untitled 84 X 72	$10,000
(2)	Bluhm, Norman	VM59	Madman's Oasis, 1957 72 X 80	$10,000
(3)	Downing, Thomas	VM363	Sky Sheet, 1963 93 1/4 X 93 1/2	$15,000
(4)	Downing, Thomas	VM470	Morning Star, 1961 87 3/4 X 91	$15,000
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(7)	Downing, Thomas	VM507	Untitled, 1958-59 91 X 85	$15,000
(8)	Downing, Thomas	VM510	Rudder, (Parallelogram) 101 1/2 X 79 5/8	$15,000
(9)	Downing, Thomas	VM480	Dapple 74 X 71	$35,000
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(12)	Mehring, Howard	VM404	Untitled, 1959 102 1/4 X 96	$30,000
(13)	Mehring, Howard	VM405	Untitled, circa 1961 91 3/4 X 81 3/4	$30,000
(14)	Mehring, Howard	VM197	Untitled 76 X 76	$20,000
(15)	Davis, Gene	VM402	Black Rhythm 88 5/8 X 84 1/8	$20,000

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(16)	Thomas, Alma	VM 701	Mars Reflection 60 X 60	$15,000
(17)	Thomas, Alma	VM	Wind Dancing With Spring Flowers 50 X 48	$10,000
				320,000

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